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Chesapeake & Ohio Classification Yards Nearing Completion

The Great Bulk of Heavy Excavation at Clifton Forge Involving an Important River Change with Curve Elimination of Main Line Is Almost at an End

ONE excavation contract which has attracted much interest among excavating contractors and railroad men throughout the country is that of the Brooks-Callaway Company of Atlanta, Georgia, involving some two and a half-million yards of heavy excavation, most of which is rock, and the reduction of a heavy curvature on the main line of the Chesapeake & Ohio Railroad at Clifton Forge, Virginia.

The entire work covers a distance of only two miles. Large classification yards are being built, and a 24-track concrete bridge is under construction, the main purpose of the work being the provision for adequate classification yards for the heavy traffic passing through Clifton Forge.

The Excavating Engineer has watched the progress of the work with much interest, and in November, 1923, published an article concerning the excavation. Lately we have been informed of recent progress made, and are publishing herewith views which were taken last month.

In spite of the fact that operations had to be carried on under main-line traffic, and furthermore were made more difficult by the presence in the proximity of a hospital whose patients had to be considered when blasting was required, they have moved from April, 1923, to the present time a vast amount of yardage.

They have driven the main-line cut west of the bridge across the Jackson River down to grade, and are rapidly filling in the land reclaimed from the river by means of two channel changes. The operations west of the bridge involve the moving of a hill, thereby straightening the main-line entrance to the yard from the west. This hill was crossed by a highway from Clifton Forge to

A closer view of the Bucyrus Class-24 dragline taking first cut in new river channel. This machine has a 115-foot boom and a 3¼-cubic-yard bucket.

Another View of the Channel Showing the Bucyrus Class-24 Dragline in the Background

Covington and westward to West Virginia, which was obliterated for about a mile, a temporary road having been built to permit the passage of automobiles and wagons.

The old track bridge is still standing and handling the railroad traffic, but is to be replaced by a 300-foot concrete structure carrying 22 tracks. About two-thirds of this bridge is built and ready to receive the tracks as soon as the cut west of it is completed.

While this work was in progress a Bucyrus Class-24 dragline excavator was engaged in removing two bends in Jackson River to provide for the classification yards west of the bridge. On June 10, 1923, work was begun on a 3600-foot channel change, and on the completion of this one a second channel 1800 feet long was cut. At the end of fifty-one weeks — on June 3, 1924 — both channels were completed. From these channels, which average 25 feet in depth and 100 feet in width at the bottom, about 500,000 cubic yards of material were removed.

A Well-Equipped Australian Cement Plant

Description of the Kandos Cement Company's Plant at Kandos, New South Wales — Aerial Cableways Transport Material from Quarry to Plant — Railroad-Type Shovels Mounted on Caterpillars Are Feature of Limestone Quarry

PORTLAND CEMENT, the basic element in concrete, is now a century old. We are told, by our sages of the industry, that concrete is only half discovered. The composition of cement and the mechanism of its reactions are still speculative but its possibilities are increasingly evident and increasingly appreciated. Its use is becoming more general with the advance of science and engineering, and because concrete is the most flexible, serviceable and simple of construction media, and derived from raw materials more generally available than those of any other product of such importance to industry, its use has become universal.

Although the cement industry is a hundred years old, the extensive commercial use of concrete, like the products of many of our other great industries originating from a natural source, such as iron and steel, oil and brick, did not come into its own until comparatively recent years.

As a matter of fact, it was not until after the advent of the steam shovel into the industry that cement was produced on a quantity production basis, and the introduction of this appliance, which marked a turning point in the industry, was less than thirty years ago. Today there is hardly a cement plant of any size in the United States which has not found the power shovel an indispensable tool in extracting the raw material from the earth.

We have always been lead to believe that here in the United States we have reached the acme of perfection in highly organized cement plant production, and perhaps we are justified in believing so, but there is one foreign operation which may well serve as a model to us here in this country, from which a lesson or two may be drawn. We refer to the plant of the Kandos Portland Cement Company in Kandos, New South Wales.

Location

Kandos, a city of 2500 inhabitants, surrounds the company's works in the southern part of New South Wales in the Blue Mountains, not far from the coast, and is situated on the Mudgee Division of the New South Wales Government Railways between Sydney and Mudgee. At this point, the complete process up to the finished product is carried out, raw materials and coal being within easy haulage distance.

The Quarry

The limestone quarry is located three miles west of the town and works, and is connected thereto by aerial cableways. The material here consists of a 90% calcium carbonate and it is said that enough material is in sight to last for several centuries. The quarry has a varying height up to 150 feet from the floor, and has a length of 1500 feet; it is uniformly clean and safe

A view of the factory looking south. Close scrutiny of the view will reveal the unloading terminals and the smoking kiln stacks at the left center. The coal mine referred to in the article is on the hill in the background. At the right are the copper smelters, and the Mudgee line of the New South Wales Government Railway may be seen at the extreme right. The large stack in the center right is that of the power station, 175 feet high with a 6-inch wall.

The Bucyrus 68-C is seen here loading into 12-ton dump cars hauled by a 220-volt direct current locomotive. The shovel, as may be seen, is mounted on caterpillars. This company also owns a Bucyrus 103-C shovel which is mounted on caterpillars, and was recently put into operation.

Views of the Kandos Cement Company's Operations at Kandos, New South Wales

with practically no overburden. The usual practice of blasting is to fire sets of six or more vertical holes drilled the full depth of the face by a churn drill in conjunction with shorter holes into the toe, whereby this portion is blown clear immediately before the mass of rock falls, thus facilitating loading operations.

Shovel Operation

The excavation is done entirely by two modern railroad-type shovels, a Bucyrus 68-C mounted on caterpillar traction and equipped with a 2½-yard dipper and a Bucyrus 103-C shovel also mounted on caterpillars and equipped with a 3½-cubic-yard dipper. Both shovels are electrically

The aerial ropeways showing the town of Kandos at the left. The individual loads carried over these single lines from the crusher to the plant are one ton in weight. The aerial ropeways have eliminated a severe problem of transporting the material over the range.

operated. Electric power is obtained from a substation which is connected to the works power house by a duplicate 5000-volt alternating current transmission line. In the substation duplicate three-phase transformers step down a portion of the supply to 440 volts alternating current, on which the shovels are operated.

The shovels load the material into 12-yard standard-gauge dump cars, hauled by electric locomotives, which operate on a circular track running on an easy down grade through the crusher house. The 12-yard cars were built to the specification of the company and are automatically operated. When the cars are brought to the crusher, an overhead travelling crane operates a tipping device by engaging a wire rope on the side of the car, which opens the side doors and tips the load into the jaws of the huge 5-foot by 4-foot Traylor crusher. This crusher weighs 150 tons and is equipped with an 18-ton swinging jaw, delivering to the conveyor 250 tons of limestone per hour crushed to a 6-inch gauge or 518 tons per hour to a 9-inch gauge.

The crushed stone is further reduced in the pulverizing mill, and from here it is taken by a conveyor to the aerial ropeways which convey the material to the plant three miles from the quarry. Two of these ropeways are employed, each one carrying skips containing one ton, which is tipped over the conveyor tunnels at the works terminal.

The Shale Quarry

A unique feature of this operation lies in the fact that all of the raw materials are within easy distance of the plant. The shale, which is an important constituent of the finished product, is quite close to the end of the works, and is taken out in horse-drawn carts, the output required being but a fraction of the limestone. This product is mixed with the crushed limestone in proportions which are determined by the impurity of the limestone from tests made at frequent intervals.

The Manufacturing Process

When the limestone is delivered to the plant by the aerial ropeways from the quarry, it is mixed with the necessary amount of shale and conveyed to the dryers. These are similar in appearance to the kilns, being cylinders which rotate on an axis and expose the material to the heat of furnace gas. After the drying has been completed, the material is elevated into mill hoppers by a Jeffrey conveyor. Four 6 x 30-foot Compeb mills grind it to a uniform fineness of 92% through a 200 mesh.

View of Kiln Department taken from the firing end. One German-made, four English-made and five American-made kilns are used.

From here it is delivered to the silos which provide storage for the raw material. Four kilns 140 feet long and 7 feet 8 inches high, two 8-foot and one 9-foot diameter, are set with large dust chambers automatically kept cleared of dust, and arranged to be connected to waste heat boilers. Coal is supplied by three small mills after being dried in a double-tube dryer. The kilns are driven by a variable-speed motor at approximately ½ R. P. M. and deliver about 500 tons of clinker per day.

From this process the clinker is removed to the fine grinding mills, whence it emerges in its

The upper view shows quarry, looking north, showing the 68-C in the center, and the crusher building at the right. The height of the working face is 150 feet in the center, and is about 1500 feet long. The lower view shows the Bucyrus 68-C mounted on caterpillars doing development work preparatory to actual quarry operations.

marketable form of fine cement, 90 per cent of which will pass through a 32,400 mesh screen. Two more of this type of grinding mill will soon be added to the plant.

In this story, some attempt has been made to show that the significance of the Kandos Cement Company's work lies in a great measure in the completeness with which every detail has been devised and arranged to produce the maximum of result with the most convenient means. The company has strictly adhered to the policy that speed, continuity and economy of each operation are secrets to its efficiency. Therefore, no effort or expense has been spared to secure the best machinery, the most advantageous layout, both at the quarry and the works, and the best men for the important positions. The Kandos Cement Company has always, therefore, stood for the best that is possible to obtain, the only proof of which lies in the excellent product that they produce.

New Method of Measuring Sand Makes Concrete More Reliable

The reliability of concrete construction is likely to be increased, and the cost in some cases reduced, by the application of a newly developed method of measuring sand, which is now being tested at the Bureau of Standards of the Department of Commerce. The method has been termed the "inundation method" and consists of measuring sand in a container which has been partly filled with water before the sand is put in, so that when the sand is in, the water is up to the top and the sand completely soaked.

The volume occupied by a given amount of sand when shoveled into a measuring device varies with the moisture content of the sand; the difference in measured volume between dry and moist sand being usually from 10 to 15 per cent and occasionally running as high as 50 per cent. But it is found that if the sand is completely soaked or "inundated" uniform measuring results can be obtained no matter how much the original moisture content may have varied.

In making concrete the proportions of cement, sand, stone, and water are so chosen as to get the required strength and workability with a minimum of cement, since the cement is the chief factor in the cost. Inaccurate measurement of the sand may result in too large a proportion of sand, in which case the concrete is too weak; or in too small a proportion of sand and hence a concrete too rich in cement.

But this rich concrete is not necessarily stronger than the concrete the contractor intended to make, for the sand has brought in some water in addition to that which is added on purpose; and if this extra water is not allowed for and the amount of water added correspondingly decreased the concrete will contain too much water. It will be sloppy and when set will not be dense enough to give the necessary strength. The contractor therefore is merely wasting cement and doing good to no one.

It is hoped that with the inundation method it may be possible to specify concrete by the strength required rather than by arbitrary proportions. The contractor can then find the proportions of the materials he is using that will give the requisite strength and can adhere closely to these proportions. The result will be a concrete whose proportions are more nearly what they were intended to be, and with which a lower factor of safety can be used.

Quarry Operation in France

How a Veteran of the American Expeditionary Forces Cut Previous Operating Costs by 50%

TO those of us who were fortunate enough to cause his Imperial Highness, the Kaiser, annoyance by visiting his front line trenches some time during the years 1917 and 1919, the sight of Yankee steam shovels doing their bit was a common or uncommon occurrence, depending upon whether we frequented the front or rear zone of actions.

However, this may be, the fact remains that any number of shovels, both the revolving and railroad-type, were used during the war, principally at the great supply centers or base parks or wherever the engineers had earth to move in a hurry. The subsequent fate of these warriors may at times have occurred to us.

Many have gone to other parts of Europe, where they are engaged in more peaceful pursuits, and some are still in France. A large number were taken over by the progressive firm of Brunner & Marchand, of Paris, and resold to mines and quarries in France, Spain and other countries.

It is one of these installations that is the subject of this article.

The above-mentioned firm of Brunner & Marchand saw in the quarry of Societe des Ciments Portland Artificiels d'Origny, Ste. Benoite, a possible application of a modern railroad-type shovel. So confident were they that this new method of operation would show results, that in the spring of last year they placed a Bucyrus 78-C in that quarry, giving the company the option of buying. The result was a quick sale, followed some eight or nine months later by the purchase of a second of the same type.

This quarry is situated on the Oise River in the Department of Aisne in Northeastern France at Origny Ste. Benoite, near the little town of Thenelles, which is hardly ten miles from St. Quentin, made so famous during the war.

The quarry is cut into a plateau which overlooks the Oise River, and consists of a heavy bank of chalk covered by a layer of brick clay of varying thickness, the maximum being 6 feet. This brick clay is being used for the most part in the manufacture of cement, and to a certain degree also of bricks.

For a long time this quarry was worked by hand, which has given it a very irregular appearance. The method was to employ twenty men working against a face of 250 feet, which resulted in a daily production of 325 tons. Horse-drawn dump cars with a capacity of one cubic yard were used to haul the material a distance of 300 yards to the plant.

Bucyrus 78-C shovel owned by Societe des Ciments Portland Artificiels d'Origny, Ste. Benoite, France. It was formerly operated by the American Expeditionary Forces during the war.

The first 78-C, which was equipped with a 2½-cubic-yard dipper, was installed in March, 1922. At the time that this is written this shovel is working against a 525-foot face. When the quarry takes on a more regular appearance, the face will assume a depth of from 750 to 900 feet. The method of transporting the material to the plant is still the same, but the installation of new equipment which will handle the output of the shovel more economically is at the present time under consideration. The dump cars will probably have a capacity of 2½ or 3¼ yards and will be drawn by tractors.

The shovel can without difficulty excavate the material without the aid of explosives, but owing to the height of the face the material is broken down beforehand, in order to prevent the occurrence of slides while the shovel is in operation.

In spite of this precaution, 150 to 300-foot slides occasionally interrupted the shovel. The plan of procedure contemplates reducing the height of the benches as soon as this is practical, in order further to obviate this difficulty. The breaking down of the face mentioned above in advance of the shovel has been accomplished by a special crew of two to four men, who work on the upper part of the face breaking down the material partly by hand and partly by the use of black powder.

When the work was first started, the chalk broke in such large pieces that a rock crusher was considered. However, later on, when the shovel began to encounter a more regular face, and after the operator became more experienced, the necessity of a crusher was obviated.

The shovel has been digging steadily without delay since March, 1922, and in spite of the slow and inconvenient method of transporting the excavated material in one-cubic-yard dump cars this quarry maintained a daily production of 508 tons before the installation of the second shovel. This was a considerable improvement over the common-labor method previously employed, where twenty men had been used, as only seven men were needed with a one-shovel installation in order to nearly double the output.

The stripping of the clay blanket or overburden referred to in the early part of this article is done by hand. A crew of two men throw the clay into the pit where it is loaded into cars by two other men. This work at first proved to be quite dangerous, due to the large number of unexploded shells and hand grenades encountered. A glance at the map will reveal the fact that this quarry is located in that very part of France which was almost constantly under shell fire during the war.

Work has been progressing in a most satisfactory manner, especially after the second shovel started work. It is expected that with the installation of a more convenient hauling method, still more favorable outputs will follow.

Rock Asphalt—From Quarry to Pavement

Description of the Uvalde Rock Asphalt Company's Plant in Uvalde County, Texas, Where a 20,000-Acre Deposit Is Being Operated

ALTHOUGH the value of rock asphalt as a paving material has long been recognized by the American road-builder, comparatively speaking, very little has been used in the United States, excepting in those coastal cities alone to which importations of the product may have been made without prohibitive costs of shipping. In spite of the fact that this material has been used as paving material for a great many years in European cities, the development of the rock asphalt industry in the United States began only in this century, and did not reach an active height until after the War.

Though the existence of a large bed of bitumen-permeated limestone, somewhat similar in appearance to but considerably different in substance from oil shale, was known thirty-five years ago in Uvalde County, Texas, the deposit was worked then only for the purpose of extracting the bitumen from it for paint and varnish. Of this particularly rich deposit, *Rock Products* tells us: "All of the light volatile substances have long been extracted from the original, or primary, oil-bearing rock so that only limestone impregnated with bitumen remains. Naturally, a material that has been weathered for perhaps millions of years has extremely high resistance to the effect of water and to erosion, and it is this which gives rock asphalt its value as a paving material."

For that reason, it would seem, the Uvalde Rock Asphalt Company of San Antonio, Texas, are busily engaged in filling the demand for this material in most of the principal cities of the

Uvalde Rock Asphalt Crushed and Loaded Ready for Shipment

Bucyrus 70-C Loading Western Dump Cars Hauled to the Crusher by a Shay Locomotive

Piece of Uvalde Rock Asphalt Found in the Bed of Turkey Creek which Has Been Subjected to the Elements for Years

The Crushing and Loading Plant

Views of the Uvalde Rock Asphalt Company's Operations in Uvalde County, Texas

Southwestern United States. It is estimated by engineers that 300,000 miles of pavement 2 inches thick and 18 feet wide could be laid with the rock asphalt that lies in Uvalde County alone. This company owns and operates 20,000 acres in this district, and in order to produce their product in large volumes in an efficient manner, they have spent $250,000 in equipping their mine with every modern appliance.

A Battery of 18 Ingersoll-Rand Jackhamer Drills Used in Drilling the Rock Asphalt Preparatory to Blasting

The Uvalde Rock Asphalt Company was organized in 1911. Their quarry is six miles from Cline, Texas, about 110 miles west of San Antonio, and is served by a standard-gauge railway which connects with the Southern Pacific Lines at Cline.

Stripping Operations

The stripping consists of a soft limestone rock similar in structure to the fossiliferous rock asphalt without the bitumen substance. On certain portions of the property there is no stripping necessary, while on other portions it runs to a depth of 50 feet. At the time this article is written the overburden averages a depth of 15 feet.

Diamond Core Drill Used in Putting Down Test Holes

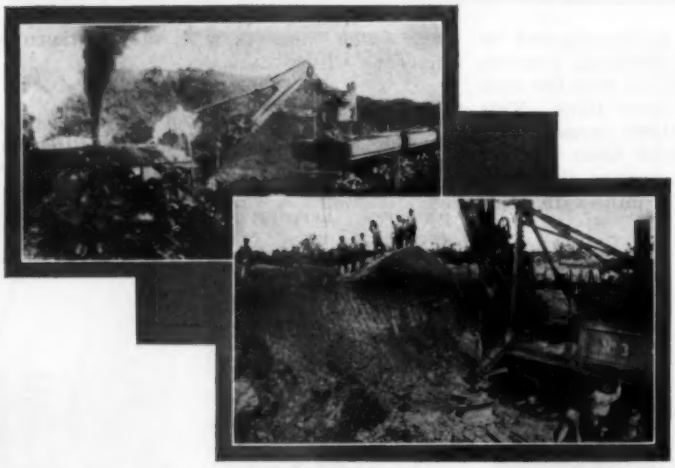
The stripping is done by a dragline excavator taking a cut 135 feet wide and 700 feet long, and the waste material is dumped beyond the outcrop. Where the stripping runs into pockets, it is also cleaned out with the dragline, which is operated only on an average of 5 hours a day.

Blasting and Excavating

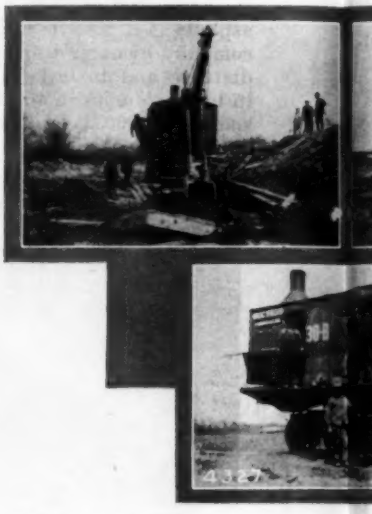
After the overburden is removed from the deposit the material is ready for excavating and loading into the dump cars. The thickness of the

(Continued on page 306.)

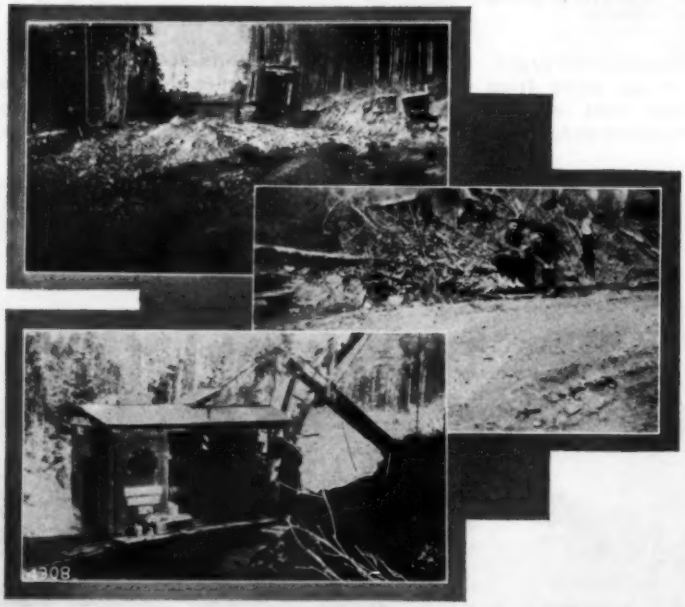
The Bucyrus 70-C Loading Uvalde Rock Asphalt into Western Wheeled Scraper Dump Cars Preparatory to Hauling to the Crusher



The above two views were sent to us by A. H. Quallo, 72 Gonzalo de Quesada, Cameguey, Cuba, illustrating two of the three railroad-type shovels in operation on the Santa Cruz and Nuevitas Branches of the Cuba Railroad Company's main line. This company owns three railroad-type shovels, a Bucyrus 70-C, a 78-C and an Atlantic. The latter machine, which is in operation on the Santa Cruz branch, shown in the lower view, has been in operation for a good many years. The machine in the other view is the Bucyrus 70-C, which, notwithstanding the delays of hauling, is loading fifty Westerns a day.

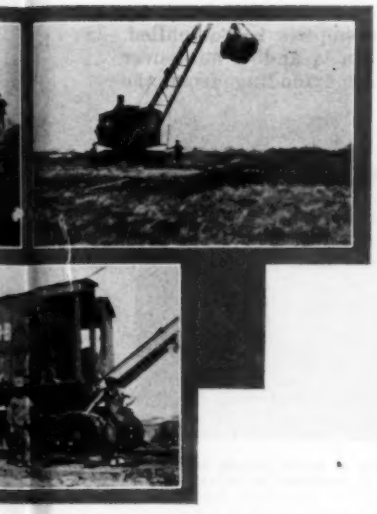


The above photographs were sent to us by L.
30-B Bucyrus steam shovel in operation reclaim
of approximately 1500 acres near Ipswich, Mas
of the shovel, tells us that in spite of the difficu
sand, they succeeded in building the dike which
the marsh. After the dike was built the shovel
equipment, for use in building ditches to drain t
L. M. Hansen, operator, August Brown, firema



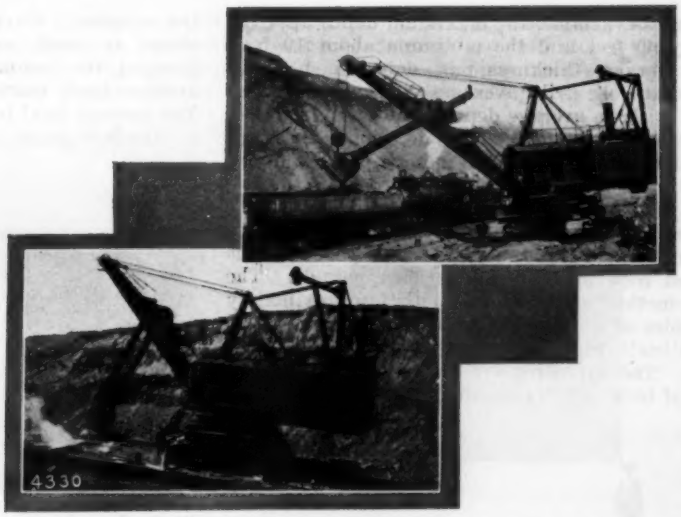
Progress is being made on K. L. Goulter's Olympic Highway Contract between Port Angeles and Agnew, in Clallam County, Washington. K. L. Goulter is a well-known contractor in that section of the Northwest, and has a number of successfully completed contracts to his credit. The shovel shown herewith is a Bucyrus 20-B Diesel ¾-yard shovel which has recently been installed on this work and which is shown here heading into 84,000 yards of heavy grading. This is Mr. Goulter's second Diesel shovel, a Bucyrus 30-B one-yard shovel having been purchased last year. Both shovels are being operated on day and night shifts. Messrs. O'Toole and Kidwell are pulling the levers during the day and Messrs. Kidwell and Roy during the night. In the view showing the two handsome gentlemen at the right are K. L. Goulter himself and W. A. De Foe, Bucyrus sales representative.

From the equator to the pole, this shovel ha
than most of its brothers. It is a Bucyrus 95-
its first dipperful having been dug on the Pana
under the guidance of the Isthmian Canal Com
Railroad. When this photograph was taken i
where it is building a long fill for a permanent

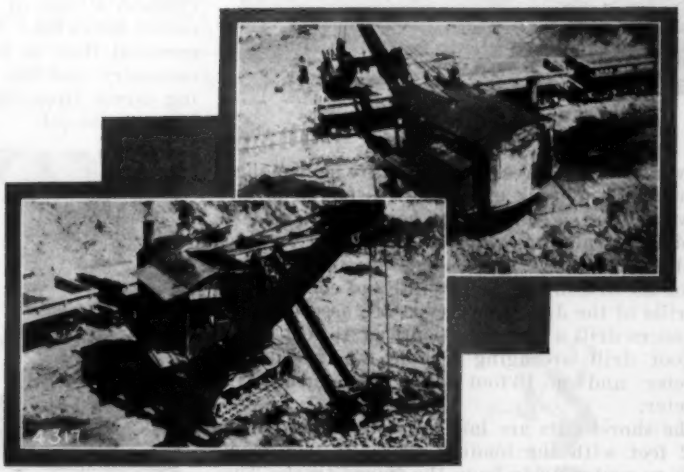


us by L. M. Hansen, and show R. T. Cram's
n reclaiming a ditch and draining a salt marsh
vich, Massachusetts. Mr. Hansen, the operator
the difficulties encountered with mud and quick-
ke which kept the tide water back from flooding
e shovel was converted from shovel to clamshell
o drain the marsh. The shovel crew consists of
, fireman, George Bush and John Burke, pitmen.

shovel has probably seen more of the world
cyrus 8-ton, 3-cubic-yard, railroad-type shovel
the Panama Canal. After a strenuous period
Canal Commission, it was sold to the Alaskan
s taken it was working at Eklutana, Alaska,
rmanent roadbed.



Because of its ease of operation and great mobility in the pit, due to its caterpillar mounting, this Bucyrus 80-B shovel is a popular one on the Minnesota Iron Range. This shovel is owned by the Oliver Iron Mining Company and is shown in operation loading iron ore in that company's Virginia, Minnesota, mine. This is the largest revolving shovel to be mounted on caterpillar traction.



The above photograph was sent to us by one of our readers and shows a shovel recently put into operation by the Long Bell Lumber Company up in the Pacific Northwest. It is a Bucyrus 50-B 1¾-cubic-yard shovel, and when the photograph was taken it was operating in a gravel pit not far from Longview, Washington.

stratum is variable, the maximum depth approximately 60 feet and the minimum about 10 feet. The average thickness, as determined by a Diamond Core drill, averages 20 feet. Only one bench with an average depth of 16 feet is carried, and two railroad-type shovels do the loading, both of which are Bucyrus 70-C mounted on standard-gauge railroad trucks and equipped with 2½-cubic-yard dippers.

The material is very hard and blasting is required at all times. One cubic yard of this blasted rock asphalt weighs 3564 pounds. The usual method of blasting is to drill approximately 100 holes at a distance of about 6 feet apart and 3 feet back from the face, usually staggering the holes. The explosive for blasting the rock consists of both 40% dynamite and 60% nitroglycerine dynamite, and investigations have shown that for every ton of rock excavated, ½ pound of explosive is used. The powder house holds 40,000 pounds of dynamite which is purchased in carload lots.

Portion of Dam Constructed of Rock Asphalt

For the drilling, 18 Ingersoll-Rand compressed air drills of the Jackhamer type are used. These appliances drill a hole to a depth of 16 feet deep, a 2-foot drill averaging a hole $2\frac{3}{16}$ inches in diameter and a 16-foot drill 2¼ inches in diameter.

The shovel cuts are laid out to carry a width of 42 feet with the loading track 21 feet from center to center away from the shovel track. The shovel loads into ten 12-yard and twelve 5-yard Western dump cars. Trains are made up of four or five cars to the train and are hauled by a Shay electric locomotive. The usual output of the plant does not generally require the operation of more than one engine in the quarry, and as a train of empty cars are being loaded at the shovel, a train of loaded cars is being taken to the crusher. Furthermore, the haul from the shovel is short, and by the time the cars are dumped, the locomotive can go back to pick up another load, leaving the empties to be refilled. The average haul is between ¼ and ⅜ mile, over a standard-gauge railroad extending from the mine to Cline station. An average of 25 cars of asphaltic rock are shipped over this line every day.

Powder House in which a capacity of 40,000 pounds of dynamite may be stored. The powder is purchased in carload lots.

The Crusher

After the material leaves the quarry it is brought to the large Austin No. 10 gyratory crusher, a view of the opening of which is illustrated herewith. No further preparation of the material than to break it into 10-inch lumps is necessary, and the rock is shipped ready for paving direct from the Southern Pacific station at Cline to the job.

The No. 9 Gyratory Crusher

The Finished Product

When the material reaches the job on which it is to be used it must be further broken until it passes through a ½-inch screen. It is then heated and mixed with enough parafine base oil to soften it and give it the desired penetration. After the

completion of this process it is ready for laying, and four hours after rolling and cross rolling by a steam roller, the street may be opened for traffic.

The material may also be laid without a heat treatment, except that the cold mixture is made with oil that has an asphalt instead of a parafine base.

The Uvalde Rock Asphalt Company employs about 125 men at the quarry, who with their families make up a good-sized village of more than 500 people. The labor is Mexican for the most part, and the company has made every effort to see its organization conveniently settled. The houses are rent free to employes, and stores are furnished them from a company canteen. A doctor and a registered nurse are employed, and a well-equipped hospital has been built to care for the sick or injured.

The officers of the company are: J. B. Smyth, President; Joe E. Carroll, Vice-President and General Manager; G. H. Alvey, Vice-President and Assistant General Manager; W. J. Dyle, Vice-President and General Sales Manager; T. S. Reed, Vice-President; Frank E. Walden, Secretary; Frank Alvey, Treasurer.

This picture shows the operation of a dragline after it has removed a part of the overburden, and a strata of rock asphalt cleaned off and ready for drilling and blasting.

The Wop

When the line is surveyed through the scenery
For tunnel and culvert and cut —
When the contractor has his machinery
The "big job" is ready — all but —
"All but" means the shovel and pick of it—
The hunkies who work till they drop.
And so, in the dust and the thick of it,
Look for the Wop.

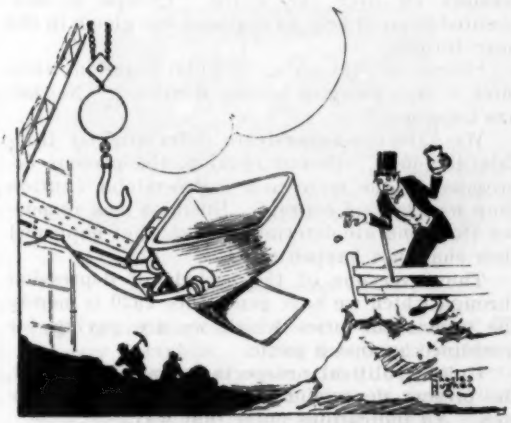
The big bosses bear all the fret of it —
They are the fellows who plan;
But the backbreaking strain and the sweat of it
Fall to the laboring man —
Dago and Russ and Hungarian —
All of the immigrant crop.
Where is the job we could carry on —
Save for the Wop.

Subject for scorn and bedeviling —
Victims of fraud and chicane —
Still, with his spade, he is leveling
Routes over mountain and plain.
Progress? His soul is the breath of it;
Lacking his hand, it would stop.
Facing the danger and death of it,
Here is the Wop.

He knows the hardest and worst of it;
He knows the hard-driven toil,
The ache and the heat and the thirst of it —
Never the dream — or the spoil.

Caves and explosions make mud of him —
Who cares a damn? Let him flop!
Progress is stained with the blood of him —
Only a Wop.

— *Berton Braley.*



"Attaboy, Fido! Speak for it!"

— *Judge.*

The Excavating Engineer

A Monthly Publication Devoted to Excavating and Allied Subjects

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Bradlee Van Brunt, Manager and Editor
South Milwaukee, Wisconsin
Printed in the U. S. A.

Courage

In one of his recent syndicated newspaper articles, B. C. Forbes, the well-known business and financial expert, expressed the following opinion:

"The conclusion I have reached is that the country is suffering more today fr m a lack of business courage than from bad business conditions.

"Does not reflection reveal that we have been shying at shadows?

"We trembled over threatened inflation. No inflation came.

"Congress was to throw the country into a panic by the most radical of legislation. Congress adjourned without stampeding the country.

"Europe was to blow up like a volcano sending tremors all over the world. Europe is now counted upon to help us to dispel our gloom in the near future.

"First, oil was going to $1.00 a gallon; then later, it was going to become worthless. Neither has happened."

We have the temerity to differ slightly from this diagnosis. In our opinion, the present depression is due more to a commendable caution than to a lack of courage. Business men remember 1920, and are determined that what happened then shall not happen again.

Thus everyone of the periods of depression through which we have gone since 1920 is merely the unpleasant price which we are paying for insurance against a panic.

Unless political prospects begin to look bad, the present depression should be of short duration. All indications point that way.

Recent weather conditions have enabled the crops to catch up nearly all their lost time, yet there is no oversupply to demoralize the market. Price developments are favorable to the farmers, and this is reflected in better business conditions in the farming districts.

Although car loadings are below those of the corresponding period of last year, yet traffic is still well above what it was in 1922, and this is true of business generally.

The iron and steel industry has suffered a heavy falling off of new orders, and as a whole is operating at less than 45 per cent of capacity, but this does not signify that consumption has fallen off to that extent. Stocks in all hands are being reduced, and representative operators believe that current rate of consumption will require a higher rate of production before many months.

Plenty of new building appears to be in prospect for the rest of the year.

So that if our caution does not degenerate into cowardice, all ought to be well.

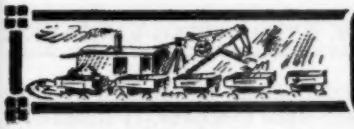
Misleading Advertising to Discredit Oil Power

Our attention has been called to an advertisement appearing on page 9, of the June 12 issue of *Engineering News-Record*, which is headed "Aha! maybe I can save a little on fuel. Who said it? The contractor or the peanut merchant?" Two sordid looking figures are represented as making the comment together. Two discs purporting to show relative earnings by steam and gas power with the steam indicating much greater earnings are shown with no supporting figures.

We hold that manufacturers of oil power equipment have rendered the construction industry a real service in developing oil power. The most convincing proof of the high earnings of oil power is the astonishing rapidity with which oil power is replacing steam on contractors equipment. — *National Reclamation Magazine.*

The Excavating Engineer does not hold any brief for gas or oil power. Steam power is too thoroughly proven to lead even a "peanut merchant" to discredit it. Our pages for 18 years stand as proof of this. However, there was never an epoch-making invention that did not evoke a cat call. The internal combustion engine is among the greatest contributions that science has given to engineering. Its application to excavating machinery is not a new thing. During the past twelve years *The Excavating Engineer* has traced its steady development to a point where it is generally considered equal in dependability to steam and under some operating conditions, far superior.

The experimental stage has long ago been past. The contractors of this country are not "peanut merchants." Their acceptance of this new power cannot be altered by a misguided attempt to throw bricks at it. Steam always will have its place but the Diesel and gasoline shovel and dragline have come to stay.



DEVICES YOU OUGHT · TO KNOW ABOUT ·

Stack Lowering Device a Boon to the Contractor

Every shovel man knows that it is a nasty job to lower a hinged stack, even with one or more men assisting, and that sooner or later the rear end of the house will be smashed in and the stack will be pounded out of shape. At the best, it is a heavy job.

The Bucyrus Company has equipped its 20-B ¾-yard shovel with a patented stack-lowering device that effectually eliminates these difficulties, and in addition has been found to be a big time saver when moving through cities under overhead

Bucyrus 20-B Equipped with Stack Lowering Device

obstructions. This device is extremely simple and consists of a small A-frame hinged to the roof as illustrated herewith. A rope is made fast to the bottom of the stack and is carried over this A-frame and attached to the end of the dipper handle. By pulling in on the handle, the stack can, therefore, be easily and smoothly lowered by one man. This is one of the many exclusive features which is unique in the Bucyrus 20-B.

The Barnes Diaphragm Pump

No, not Niagara Falls, just a "close-up" of a Barnes Diaphragm Pump, living up to its reputation.

The view herewith illustrates the operation of a Barnes Diaphragm Pump discharging a spout of approximately 12,000 gallons of water per hour from a lift of nine feet.

Underneath the railroad tracks of the Pennsylvania Lines, an undercrossing is being constructed. It is a steam shovel excavation job running about 25 feet below the railroad grade, excavating for the foundations being done with a clamshell bucket. Sheet piling was required for the footings, and soon after these were started a heavy flow of water was struck.

The contractor started his small power diaphragm outfit, but one day's operation showed him that the Power Diaphragm outfit he had could not handle the job. So he bought a Barnes 4-inch outfit.

Twenty minutes after he received the outfit he had it in operation, and in less than an hour

The Barnes Diaphragm Pump

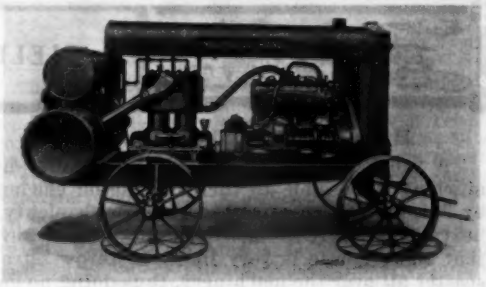
his gang was at work in the excavation showing a profit instead of "cooling their heels" on the bank.

To say this contractor is satisfied is putting it too mildly — he's a booster for Barnes Diaphragm Pumps. He has many contractor friends and he will pass the good word along. For further information, write to the Barnes Manufacturing Company, Mansfield, Ohio.

Small Ingersoll-Rand Portable Air Compressor

A small portable air compressor plant of modern design and construction has been developed and is now offered by the Ingersoll-Rand Company, 11 Broadway, New York.

This small portable air compressor, designated as the 4¼-inch x 4-inch Type Twenty, has a piston displacement of 60 cubic feet per minute, and is



Small Ingersoll-Rand Portable Air Compressor

built along the same lines as the larger Type Twenty Portables. All of the proven features of the larger units are retained, e. g., duplex, vertical compressor, direct-connected to a four-cylinder, four-cycle, tractor-type gasoline engine; enclosed construction; circulating water cooling system for engine and compressor with sectionalized-

radiator, fan, and pump; compressor regulator and engine control for reducing speed during unloaded periods; one-piece cast steel frame; sheet steel roof and removable side doors.

The machine is compact and steady. Each part is accessible. Anyone can operate the compressor. It is easy to move.

The 4¼-inch x 4-inch Type Twenty Portable opens up a new field. Its moderate cost makes it possible and decidedly profitable to use labor-aiding compressed air equipment for work which was formerly considered too small to warrant the purchase of a compressor. Every city, town, and municipality and privately-owned utility should have such a machine. It will supply necessary air for operating a Paving Breaker, "Jackhamer" rock drill or other air tools, for road and paving repairs, for digging pipe trenches, for calking pipe, etc.

Industrial plants having a central stationary air compressor would do well to add a Type Twenty Portable to their equipment. Such a unit will more than pay for itself when used for erection and repair work, and in supplying air for the many odd jobs of painting, cleaning, etc. A Portable Compressor can be moved from one job to another, and can be used in places where air lines are not installed and would be too expensive to put in for temporary work.

This compressor can be furnished with a variety of mountings; steel wheels and axles; wooden artillery wheels with solid rubber tires and steel axles; on a Ford truck; and on skids for mounting in a car or truck.

This and other sizes of Type Twenty Portable Compressors are available with either gasoline engine or electric motor drive.

Further information may be obtained by writing to the Ingersoll-Rand Company, 11 Broadway, New York.

Mine Drilling and Pumping

In mine drilling and pumping it is necessary to have a flexible connection to the drills or pumps, which is not only susceptible of great variations in lengths, and which must be entirely flexible, but which should be made preferably of metal and very rugged in construction, so that it cannot be damaged by rough handling, or in moving over rough surfaces and obstructions.

The use of Barco Joints and short lengths of pipe have become quite universal in this service, as it is impossible to damage them by any ordinary carelessness, and any damage which should occur may be readily repaired in a few minutes by removing the damaged short piece of pipe and applying a new one.

The connections may be folded up and carried from one point to another in a car or truck, occupying a minimum amount of space, and may be connected up when they are to be used with a minimum amount of time and labor.

Barco Flexible Joints have been used extensively in this service. When Barco Flexible Joints and connections are used repairs are easily taken care of and may be made during operations, and the connections will last as long as any other part of the pipe or drilling machinery, completely eliminating constant renewals formerly experienced.

Further information may be obtained by writing to the Barco Manufacturing Co., 1801 Winnemac Avenue, Chicago, Illinois.

· FIELD NOTES ·

Hints for Steam Shovel Engineers

A great many engineers do not realize how much it is possible to increase engine efficiency by keeping the gear teeth covered with plenty of heavy grease. It is important to know, however, that light grease is very likely to throw off and scatter all over the machinery, thus doing no good and serving as an attraction for dust and dirt.

When grease is thrown off the gears on to the frictions it has been suggested that a little flour or chalk will keep the frictions from slipping. Fine coal dust, however, is more convenient and often more efficient than flour and chalk. Coal dust contains coal tar, which is not slippery like flour, and cleans off the grease and causes it to roll very well.

Always open the drips before starting your engine, even after a short shut-down. There is always condensation in the steam lines, which, when the operating throttle is thrown open, is forced into the cylinders. This not only is likely to blow out the cylinder heads, but to damage the packing on the piston rods.

Do not open your fire door too soon after banking a fire, as this allows the cold draft to damage the tubes. You should wait at least 20 minutes after banking before opening the door. Always close the draft doors when you want a banked fire to last overnight.

A little coal put on at frequent intervals will make a hotter fire than a lot of coal at one time. This is especially true with fine coal. Fine coal

particularly should be scattered evenly and not banked. If you follow this rule you will make steam quicker and keep a more even pressure, besides cutting down your coal bill.

Unfortunately, there are too many cranky engineers. A new fireman is bound to make mistakes. When he goes wrong, explain his mistake to him and help him not to make the same mistake twice. If you follow this rule, you will have a more efficient crew and a better friend behind the boiler.

When setting valves, never turn the engine backwards when you are trying to put your crank disc on dead center. If you do, the back lash will cause you to set the valves wrong.

Surplus oil and grease on your machinery attracts sand and grit, which will work into your bearings, besides making your shovel look badly. An engineer can always find plenty of jobs to keep his crew busy.

A half-round file and a monkey wrench make a serviceable substitute for a Stillson.

An Approved Method of Lifting Dipper Handles

We publish below a simple and safe method of raising the dipper handles and putting them in place, suggested by George W. Williams. His method follows:

The dipper handles are lying to one side of the car with the dipper at the far end. The hoisting chain has been led over the point of boom sheave.

Attach end of chain to padlock on dipper bale. Take a bite in the chain and drop it between dipper sticks just back of dipper hinges. Stick a bar through loop, this will make the chain lead from the padlock to the handle and then up to the sheave on the point of the boom. Raise sticks and swing to the center of the car.

Place two planks lengthwise under end of sticks up against the car door allowing the sticks to clear the door. Place block under racks so that handle will slide without teeth catching on floor of car.

Remove bar from bite in chain. The end of the chain is still in the padlock.

Pull dipper back until sticks rest against the end of the car body.

Raise handles slightly and slip blocks under dipper on either side of latch keeper so as to keep dipper from rolling.

Drop loop in chain between sticks again and slip in bar. Move shovel back until the ends of the sticks when raised will clear shipper shaft.

The yoke is thrown back on the boom. Don't loosen nuts as liners will be lost.

Allow ends of sticks to rest on the pinions. Don't allow teeth to mesh.

Throw yoke block between sticks.

Move shovel ahead slowly pulling in with boom engines until teeth catch. By the time the car and the shovel come together the sticks will be two feet up. This is a safe and simple method. One hitch does the trick.

If anyone knows a better one we would be glad to hear from him.

SHOTS FROM THE FIRING LINE

Iowa and Missouri

BY W. A. PARROTTE

C. G. Herrick is showing good speed on his sewer job for the city of Des Moines. He expects to finish this work up about the first of the year.

Logerbone Bros. have finished their road contract and have moved their shovel back to Des Moines.

The city of Des Moines is figuring on straightening out the Scoon River in order to get more ground for railroad yards.

Thomson Co. are about finished with their waterworks job for the city of Omaha.

F. L. Busche, Omaha, has his Bucyrus 20-B gasoline shovel on street work north of Krug's Park, Kansas City. He also has 18 five-ton trucks on the Millard road job.

Harry Burton of the Midcontinent Fuel Co., Kansas City, Kansas, is running for Governor of Kansas at the next election. Let's all wish him luck.

New England States Notes

BY E. B. WILLIAMS, BOSTON, MASSACHUSETTS

The following highway contracts were awarded by the Commonwealth of Massachusetts State Highway Department during the month of July: Town of Templeton to C. J. Sweeney of Stoneham, Massachusetts; Town of Barre to Charles E. Horne of Milbury, Massachusetts, at $12,686.50; Town of Pembroke to Angelo Suzi of Dorchester, Massachusetts, at $72,139; Towns of Truro and Provincetown to Lane Construction Co., at $165,434; Town of Dudley to Carlo Bianchi of Framingham at $13,242; Towns of Dighton and Somerset to Canedy Construction Co. of Clifford, Massachusetts; Town of Westwood to Reynolds Bros., Inc., of Boston; Town of Grafton to Middlesex Construction Co. of Framingham, Massachusetts; Town of Ayer to Crowley Bros. of Fitchburg, Massachusetts, $3,685; Town of Medway to Joseph Morrell & Co. of North Attleboro, Massachusetts, at $6,765; Town of Hinsdale to Albion Allen of Amherst, Massachusetts, at $14,274.

Fred Gleaves is operating a Type B Erie for Bird & Kelly of Jamaica Plain, Massachusetts, on a 50,000-yard grading contract in West Roxbury.

Sam Dicenso is running a Northwest gasoline crane for the Crandall Engineering Co. on a bridge contract at Wayland, Massachusetts.

New York and Vicinity

BY T. A. BURNS

One of the biggest jobs let recently around New York is that of the contract awarded to F. J. Parker of Montclair, New Jersey, on the Erie Railroad at Paterson. This is Section "C" of the $5,000,000 grade crossing elimination work of the Erie Railroad in New Jersey, and it is understood that this section alone was awarded at a price of approximately $1,000,000.

We are informed that work is well under way for the St. Lawrence Valley Power Company's power house which is under construction at Potsdam, New York.

The contract for the work is in the hands of Morton C. Tuttle Co., Incorporated, of Boston, Massachusetts, and calls for the construction of a concrete dam on the Racquette River below the present location of the power house at Hannawa Falls, New York.

There will be a tail race for the power house, 3600 feet long, averaging 19 feet deep; machinery is being installed rapidly and the heavy work is under way.

A Bucyrus Class-14 dragline is being used to build the tail race, while a Bucyrus 14-B is engaged in digging a ditch for the steel penstock, 3850 feet long and 13½ feet wide.

The dragline will work double shift. Messrs. Geo. Anderson and Ray Templeton are the operators, and Asa Albright and William Irving are the firemen.

Mr. Ryerson is superintendent, Mr. Baker is assistant, while Frank Gilmore is master mechanic.

Northwestern States Notes

BY A. R. HANCE, PORTLAND, OREGON

Construction work on 12 stretches of county road near Spokane, Washington, costing approximately $700,000, is now about half complete and probably will be finished a month earlier than last year's road work, because of the earlier start obtained by good weather. Three stretches of road, totaling about 10 miles on the Seven Mile, Coulee Hite, and Trails-Four, Mound Highways, combined under one contract taken by the Mohr Construction Company, are partially completed, about 50 per cent of the grading is now finished. A stretch of eight miles of road on the Deer Park-Milan route is nearly complete, 80 per cent of the grading and 60 per cent of the surfacing having been done. Campbell & Barr are the contractors for this job. Fifty per cent of the grading and 30 per cent of the surfacing has been completed on the 11 miles of road being worked on between Elk and Chattaroy by Mitchell Brothers, contractors. Much grading work is still to be carried out this summer.

The Somers Lumber Company has secured right-of-way, and it is reported that they will start in a few days the construction of a standard-gauge railroad from the camp eastward to connect with the Kalispell Branch near the Soldiers' Home. The railroad will cross the Whitefish-Kalispell Highway at the Henry Good Corner and then go almost east. It will be of substantial construction.

The Anderson & Middleton Company of Aberdeen, Washington, has begun preparations for extending its logging railroad two miles into the timber, for which it recently contracted with the government. The cut must be made at the rate of 40,000,000 feet a year and in the unit is timber for a ten-years' run. This is the first unit in the tract set aside by the Federal Government for an experiment in continuous production. The logging railway is an extension of the Oregon, Pacific & Eastern, which extends up Row River to the forest reserve. The above company recently placed an order with the Bucyrus Company for a 20-B High-lift Diesel Engine Shovel to be used for the construction of the logging railroad at Cottage Grove, Oregon. These operations will disturb the city's source of water supply, and the removal of the city's intakes will be at the expense of the government.

The Oregon State Highway Commission awarded the contract for the construction of the Brighton Jetty Gap in the Roosevelt Highway to the United Contracting Company of Portland, at $65,687. The work has been sublet to Brandstrom & La Belle who will use a Bucyrus 20-B gasoline shovel in connection with same. The highway, a distance of 1.3 miles, will be constructed on a co-operative plan, the county to pay $25,000 and the state the balance. Work on the road will be started at once, but according to engineers the highway will not be ready for use until 1925, as the railroad tracks will have to be moved to another level. This is occasioned by the fact that ground must settle for nearly a year before it is safe for railway purposes. The contract closed one of the hardest fought battles ever held in this county between business men of the north end of the county and the state. About two years ago the railroad company offered to move its tracks so the road could be constructed. However, the project had been "hanging fire" because of high bids.

Contract for constructing the Heison-Fargher Lake Permanent Highway was awarded to O. D. Wolfe of Washougal, Washington, by the Clarke County Commissioners. Mr. Wolfe's bid of $67,225.91 was the lowest of the four bids submitted. Immediately after the commissioners had announced acceptance of Mr. Wolfe's bid, the Washougal contractor said that he would put a crew to work at once on the Heison-Fargher Lake job. The contract, which covers a stretch of road 5.12 miles in length, calls for grading and surfacing the road with crushed rock. The road is to be finished by December 1. Mr. Wolfe also holds contracts for grading two stretches of the La Center-Amboy Road. The Heison-Fargher Lake Road will link on to the La Center-Amboy Road at Fargher Lake. Mr. Wolfe's bid was just 90½ per cent of the estimate of $74,000 which the county engineers had figured as being the probable cost of the project. The Heison-Fargher Lake Road is being built under the Permanent Highway Act, 80 per cent of the cost of the road being paid from state funds and the remaining 20 per cent of the cost being borne by the owners of abutting property.

Pacific Coast News

BY P. H. BIRCKHEAD AND J. H. SACKETT, SAN FRANCISCO, CALIFORNIA

The Hauser Construction Company is progressing very nicely on their road job in Oxnard. Robert Gordan and W. H. Harrison are superintendents on this job. Messrs. Fox, McCarr and Hanrahan are working on the Bucyrus 30-B shovel. Mr. Prendergast is stretching the hemp on the 50-B. Mr. Morrison is operating a Marion 60. Mr. Gillis is foreman of Camp 3 and E. O. Orson is chief clerk and bookkeeper on the job.

C. H. Hudson road job out of Santa Maria is well under way and work is progressing very nicely. J. W. Johnson and M. A. Palmer are operating the Bucyrus 30-B Diesel shovel on the day crew, and Curley Woods and D. Sanchey are operating this shovel on the night crew. Jim Brookbank and Eli Booth are operating the 30-B steam shovel. J. C. Curran is superintendent on this job.

The new Perkins Rock and Gravel Co. on the San Fernando Road, Los Angeles, California, is soon to be completed, and operation of plant will begin very shortly. A Bucyrus 50-B steam shovel has been installed at the plant and will take care of the entire output.

The Potter Valley Irrigation District, embracing about 5,000 acres of land in Mendocino County, has appointed J. W. Gross, Forum Building, Sacramento, as consulting engineer to prepare plans for the construction of an irrigating system for the district. It is proposed to divert about 62 section feet from the east fork of the Russian River. Pumping plants and canals will be constructed.

Bonds voted by the City of Stockton, San Joaquin County, on June 17th, for municipal improvements, are as follows: Flood control dam — large concrete dam to be constructed below San Andreas, cost to be $1,500,000; levee — restraining levee on Littlejohn Creek, cost $100,000; motor equipment, $26,300; fire equipment and alarms, $346,000; parks, recreation, $137,900; subway on Miner Street, $100,000; asphalt concrete paving, $164,340; oil macadam, resurfacing, $19,910; storm and sanitary sewers, $77,940; two bridges, $44,750. W. R. Hogan is city engineer of Stockton.

Bond election will be held by the City of San Diego late in August to vote on issuing bonds for the following improvements: $3,600,000 for acquisition of lands and construction of arched gravity section masonry type dam at Mission Gorge Dam, Site No. 2 on the San Diego River; $400,000 for acquisition of lands for another dam and reservoir, also on the San Diego River; $225,000 for construction of shed, tracks, etc., on Municipal Pier No. 2; $250,000 for dredging bay front between Columbia and Eighth Streets and construction of 3000 feet of bulkhead. Allen H. Wright is city clerk of San Diego, San Diego County, and F. A. Rhodes is city engineer.

Plans have been completed by State Highway Commission, Heroes Memorial Building, Carson City, Nevada, and bids will be called for shortly for the construction of the following highway projects: Elko County, 12.64 miles of gravel surfacing from Moor to Pequop Summit; Elko County, 17.20 miles of gravel surfacing from Pequop Summit to Silver Zone; Pershing County, 13.69 miles of gravel surfacing from Mill City to Humboldt Line; Humboldt County, 2.40 miles concrete paving and gravel surfacing, City of Winnemucca; Humboldt County, 1.08 miles concrete paving and gravel surfacing, City of Winnemucca; Washoe County, 5.89 miles of grading from 2 miles east of Verdi to California State Line.

Plans have been completed for the following projects: Churchill County, 10.25 miles of gravel surfacing from Westgate to Eastgate; Clark County, 3.20 miles concrete paving and gravel surfacing, City of Las Vegas; Lyon County, 9.63 miles of gravel surfacing Yerington East; Humboldt County, 8.09 miles gravel surfacing from Winnemucca to Dutton Point.

Plans are being prepared on the following projects: Clark County, 10 miles of gravel surfacing across Mormon Mesa; Washoe County, 7 miles concrete paving and gravel surfacing from Sparks to Hafed; Humboldt County, 18.2 miles of gravel surfacing from Golconda to Stonehouse.

Pittsburgh and Vicinity

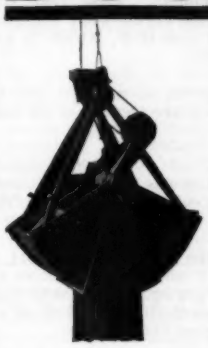
BY F. B. SMITH

The Westmoreland Limestone Company purchased a Bucyrus 30-B Diesel which is being operated in their quarry at Rumbaugh, Pennsylvania. Mr. Craig, the President of this Company, states that this machine is entirely satisfactory in every way, operating at a lower cost than any shovel they ever owned. Mr. Timmons of Pittsburgh, Pennsylvania, is at the levers.

The Tice-Flynn Coal Company are producing coal with their Bucyrus 80-B and 30-B at Sherardsville, Ohio. Mr. Flynn is manager and Mr. Ralph Adams is superin-

BUCKETS

BLAW-KNOX



No matter what your present hoisting equipment may be—overhead crane, stiff-leg derrick, monorail, cableway, locomotive or traction crane—we are prepared to furnish quickly a Blaw-Knox Bucket exactly suited to your requirements.

Single-line, two-, three- or four-line buckets can be furnished for every conceivable kind of rehandling and excavating.

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Published Monthly in the Interest of Power Plant Economy and for Recording International Development of the Stationary Oil Engine.

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tendent. This company had the misfortune of the loss by death of Mr. Tice last month. Mr. Tice was in the coal game for the past ten years, he being vice-president of the Allied Coal Company at Zanesville, Ohio, at which time Mr. Flynn was superintendent. Last year they formed the company of the Tice-Flynn Coal Company and purchased a Bucyrus 80-B and 30-B, which is now under full sway at Sherardsville.

Frazier-Mansfield were awarded a contract for the building of a new highway. They are located at McKeesport, Pennsylvania.

Bob Cunningham was awarded a $350,000 contract for the construction of a new highway in Butler County. They have on this work a Bucyrus 30-B and 20-B. This work is well under way.

Progress is reported on the highway contract of McCready Bros. of Braddock, Pennsylvania. There are 80,000 yards of earth and rock excavation on this work. McCready Bros. have three shovels in operation on the job, a Bucyrus 30-B and an Osgood and an Erie.

Southern States Notes

BY C. N. BALLENTINE AND W. W. WHORLEY

C. M. Brown is stripping overburden with a Bucyrus 70-C for the Hall Construction Company at Attapulgus, Georgia. Harry Touchton is riding the boom. After the cover is removed, the fuller's earth is loaded with revolving shovels. J. P. Hauck is handling a Thew and C. S. Strickland is running a Marion-21.

Mr. C. M. Shaeffer, general superintendent of the Attapulgus Clay Company, is in charge of operations.

E. L. Miller is loading highway gravel for J. H. Bull with a Bucyrus 20-B near Haleyville. Frank Ralston is keeping plenty of steam and Jack C. Bull, one of Mr. Bull's sons, is pulling the dump rope.

A. R. Henson is operating a 50-B Bucyrus for the Gifford Sand and Gravel Company, loading ballast for the Texas & Pacific Railroad at Roanoke, Texas.

Contracts covering 75 miles of highway construction and amounting to nearly $1,000,000 were awarded by the Tennessee State Highway Department at Nashville, on June 20th. Following is a list of the successful bidders:

Federal Aid Project 29, Section A, Gibson County, two miles of road and two bridges awarded to Cresap Brothers, Humboldt, Tennessee, $34,877.42.

Federal Aid Project 29, Section B, Madison County, two bridges, awarded to J. A. Peterson, Montgomery, Alabama, $80,941.27.

Federal Aid Project 29, Section B, Madison County, eight miles of road, awarded to F. D. Harvey, Memphis, Tennessee, $46,046.98.

Federal Aid Project 31-A, Tipton County, ten miles road and one bridge to J. A. Pardue & Company, Pine Bluff, Arkansas, $106,053.27.

Federal Aid Project 31-B, Tipton County, seven miles of road awarded to Little & Dean, Memphis, Tennessee, $43,989.14.

Federal Aid Project 31-B, Tipton County, three bridges, awarded to Ellis & Smouthers, Owensboro, Kentucky, $33,029.50.

State Aid Project 151-C, Coffee County, nine miles of road awarded to Pitts Brothers, Mt. Pleasant, Tennessee, $84,387.25.

State Aid Project 163-B, De Kalb County, four bridges, Nashville Bridge Company, $103,556.94.

State Aid Project 167, Gibson County, nine miles road and one bridge, awarded to S. R. Hall, Newbern, Tennessee, $58,950.58.

State Aid Project 168, Madison County, four miles road and one bridge, awarded to F. D. Harvey, Memphis, Tennessee, $58,562.75.

State Aid Project 169-A, Obion County, eight miles of road and one bridge awarded to Ellis & Smouthers, Owensboro, Kentucky, $74,349.90.

State Aid Project 169-B, Obion County, five miles road, awarded to Ellis & Smouthers, $35,067.71.

State Aid Project 170, Marion County, five miles of road and four bridges awarded to Brown Brothers & Company, Tracy City, Tennessee, $136,923.69.

State Aid Project 171, Grundy County, five miles of road and two bridges awarded to Brown Brothers & Company, Tracy City, Tennessee.

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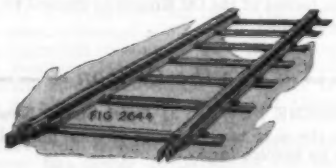
PORTABLE TRACK, CARS, SWITCHES, TURNOUTS

KOPPEL equipment is designed and constructed to stand the strain of contractors' service.

Ask for Bulletin No. 43



Koppel Industrial Car and Equipment Co.

KOPPEL, PENNSYLVANIA

SALES OFFICES:

New York Pittsburgh Detroit Chicago

TRADE NOTES

The Robert June Engineering Management Corporation of Detroit, which handles industrial advertising, sales development and engineering management, has moved from its present address at 8938 Linwood Avenue, to 8835 Linwood Avenue. This move, which is the second in six months, more than doubles the office space, and is made in order to provide better facilities for service to the organization's clients, and to provide more room for the organization's research and data files and engineering library.

Mr. C. B. Crutchfield of Hopkinsville, Kentucky, has been appointed Southern Field Sales Manager for the Leach Company of Oshkosh, Wisconsin, manufacturers of concrete mixers, builders of saw rigs, and logging and line construction tools.

Prospective industrial and municipal users of air-lift water supply systems should be interested in the

recent agreement entered into between the Indiana Pump Company, Indianapolis, Indiana, manufacturers of air-lift equipment, and the Chicago Pneumatic Tool Company, New York, New York, builders of air compressors, whereby each organization will use jointly, and exclusively, the products of each other on all their air-lift installations. Thus the tremendous increase in demand for air-lift pumping systems in the United States and Canada is now served to the best advantage by the experienced engineering staff of both companies. Technical consultation relative to the combined unit is available at any one of the many branches of either company.

Road dust, a subtle but vicious enemy of motor truck and passenger car engines, no longer receives important consideration by owners of GMC trucks which are equipped with an air cleaner, according to V. H. Day, general sales manager of the General Motors Truck Company.

"The GMC truck engine which has for some time had an air cleaner as standard equipment, is not affected by the ravages of dust and fine grit, because of the effectiveness of this equipment," continues Mr. Day. "The danger of dust accumulating in the motor and cutting it is very prevalent in trucks which must make use of all kinds of highways. Sand, gravel and silica pits, where trucks are in almost universal use, also hold great dangers for the truck motor."

"One of the outstanding examples of this danger came to light in a silica pit where the engines of the trucks in use were so badly damaged within a few weeks that they had to be completely overhauled. The substitution of trucks equipped with air cleaners solved the problem."

Mr. J. F. Buhr has opened an office in the Blodgett Engineering and Tool Co. Building, at 14th and Dalzelle Streets, Detroit, Michigan. The J. F. Buhr Machine Tool Co. will act as sales representative for the Blodgett Engineering and Tool products. The outstanding item of these is the Buhr Ball-Bearing Fully Adjustable Multiple Driller. The Blodgett Engineering and Tool Co. also specializes in fine tool and die work.

To serve their customers better in the Southwest the Chicago Pneumatic Tool Company announce the opening of a branch office, 210 South Jefferson Street, Dallas, Mr. J. O. Bailey in charge, reporting to New Orleans Branch.

C. K. Wehn, in charge of sales of Blaw-Knox Standard Steel Buildings in the Pittsburgh district, has in addition to his present capacity been made assistant sales manager of the Standard Building Department.

A study of truck manufacturing methods at the General Motors Truck Company, Pontiac, Michigan, has just been completed by W. G. T. Goodman, general manager of the Adelaide, Australia, Municipal Transportation Trust, and Charles Williams, a director in the same concern. The Australians are making a survey of passenger transportation systems and media in this country, and report that Australia contemplates large extensions to its motor truck and bus lines.

Estimates made in connection with the various road-building programs throughout the country show that approximately 1,000 pounds of explosives are required in the construction of each mile of the new roads. These explosives are dynamite and blasting powder. They are used for blasting the stone from the quarries, for clearing out obstructions in the right-of-way and for drainage purposes.

The quarries in the United States use in the neighborhood of sixty million pounds of explosives per year, and about half the material obtained goes for road work. On an average three tons of stone are moved per pound of dynamite. Explosives manufacturers have also developed a system of shooting electrically, which adds to the efficiency and safety in the use of high explosives, and has been responsible for saving much time in road construction.

OIL ENGINE DRIVE FOR DRAGLINES AND DITCHING DREDGES

RANDOLPH-PERKINS COMPANY
Geo. B. Massey, Vice President
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Holds 20 Per Cent More Dirt — Easiest Running — Largest Skeins — Quickest Dumping — Simplest Chains — Easiest Loading — Best Balanced — Heaviest Hubs — Widest Tires — Strongest Front End Construction — Strongest Arch.

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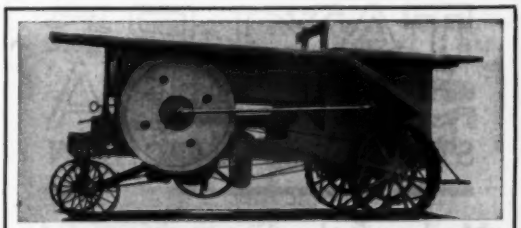
OMAHA, NEBRASKA



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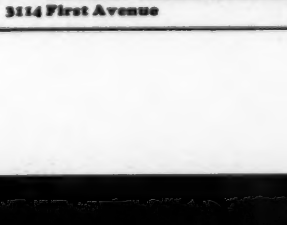
The most wonderfully efficient Blast Hole Drill produced! It is faultless, simple, durable, easily maintained, it commands your investigation. Days are not too long nor rock too hard for this famous Drill. There is a reason why it predominates.
THE LOOMIS MACHINE CO., (Established 1842) K Street, Tiffin, Ohio



Lower Costs Per Yard with La Plant-Choate Dump Trailers
Bulletin No. 6 sent on request

Live, wide-awake contractors all over the United States are rapidly adopting the La Plant-Choate 5-yard tractor-drawn dump trailers, because they can haul loose material in all kinds of weather at the most economical yard cost.

We manufacture a complete line of heavy-duty dump and platform trailers, and special steel wheels, and running gear for mounting equipment. Write for prices.

La Plant-Choate Manufacturing Company
3114 First Avenue Cedar Rapids, Iowa

HARD ROCK

When Your Shovel is Digging in Rock Like This, It Must Be Equipped to Stand the Heaviest Digging Strains

TAYLOR MESABA

STEAM SHOVEL CHAIN

Made of the Finest Material, Short Links and Perfect Welds

Is specially made to withstand the short, sharp jerks and sudden strains of the heaviest rock excavation

Sizes Carried in Stock for All Makes of Shovels:

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641 Marquette Building

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REVIEW OF BOOKS and CATALOGS

We shall be glad to review, in this column, such books and catalogs as are sent to us.

"ORIGIN, DEVELOPMENT, RESULTS OF ELESCO" is the subject of a booklet which is published by *The Superheater Company of New York and Chicago*, manufacturers of Elesco Superheaters. It gives in brief form the history of The Superheater Company and the growth of its operations up to the present time when it occupies the unique position of manufacturers of superheaters for every type of steam boiler in locomotive, marine and stationary services. The development of the use of high degree superheated steam is traced from the earliest experiments of the late Dr. Wilhelm Schmidt of Cassel, Germany, to the present tendencies in steam generation in this country. An interesting paragraph is the one that explains the origin of the trade name "ELESCO" applied to the products of that company. A copy of this book will be sent to anyone mentioning this publication.

"MINIMUM SPECIFICATIONS FOR HIGHWAY ENGINEERING POSITIONS," by *A. B. McDaniel*. The National Research Council, through its Advisory Board on Highway Research, has recently issued as Bulletin 45, a unique report on "Minimum Specifications for Highway Engineering Positions."

The report lists the essential qualifications for the filling of 17 typical highway engineering positions. It also prevents a series of 117 actual problems which have arisen in the everyday work involved in carrying out the duties of the various positions. The solutions used are given in some instances and are available for all the problems.

This report will be of particular value to those who teach young engineers, who employ the services of highway engineers or who are in any way charged with the administration of highway engineering organizations. It is intended to be of practical service to those concerned with the proper selection, assignment, promotion, transfer or training of highway engineers.

This book of 105 pages with 32 line cuts and numerous tables may be obtained from the Washington Office of *The National Research Council* for $1.00.

Our readers will be interested to learn that the *Madison-Kipp Company* have recently issued a new bulletin describing their MODEL 50 FORCE-FEED MECHANICAL LUBRICATOR. The bulletin is handsomely illustrated and contains valuable information on lubricators and their manufacture. A copy may be had by writing to the *Madison-Kipp Corporation, Madison, Wisconsin.*

The M. A. Hofft Company has just had issued a new booklet describing in detail NATIONAL FURNACE ARCHES. The booklet points out the lower maintenance costs, outstanding advantages, ease of installing and replacements, as well as other exclusive features of the National Arches. The publication is just off the press and is obtainable by addressing the *M. A. Hofft Company, 814 West Washington Avenue, Indianapolis, Indiana.*

One of the most interesting new publications issued recently is the book "BETTER STREET LIGHTING WITH GREATER SAFETY." This describes the Kuhlman Series Multiple Street Lighting Systems, and can be obtained by writing the *Kuhlman Electric Co. at Bay City, Michigan.* The Kuhlman Electric Co. is the originator of the series-multiple transformer and much instructive data is incorporated in this book.

Westinghouse Announces Line of Pipe Fittings in New Publication

In a 36-page, two-color publication entitled "WESTINGHOUSE FITTINGS FOR PIPE STRUCTURES," the *Westinghouse Electric and Manufacturing Company* has recently announced a new and complete line of interchangeable pipe fittings for structural work. The publication, which is known as Circular 1676, describes these fittings and gives their application to such work as the erection of outdoor substations, switching equipment, switchboard frames, racks, railings, fences, etc. It contains an unusually large number of photographic illustrations, supplemented by dimensional drawings, making the publication useful as a reference book for the designer of such structural work.

An adjustable insert for fastening machinery or other equipment to concrete floors, walls or ceilings, another new Westinghouse product, is also described and pictured in the publication.

Lubrication of Heavy Construction Equipment

The McCord Radiator & Manufacturing Company has just had issued a booklet describing the part lubrication plays in the dependable operation of heavy machinery, such as steam shovels, cranes, dredges, hoisting engines and coal and ore handling apparatus. This booklet points out that the continuity of service, reduced maintenance costs and satisfactory operation of equipment, is due to efficient lubrication. The publication is known as the CLASS BA CATALOG and contains a very detailed description of their Class BA Force Feed Lubricator with illustrations and price lists. Copies may be had by addressing *The McCord Radiator & Manufacturing Company, Lubricator Division, 2587 East Grand Boulevard, Detroit, Michigan.*

For your **Hard** Digging
you need a **WILLIAMS**

A stronger bite for the tough materials, and gives bigger output on all work.

The larger output that you get with the WILLIAMS "Special Dredging" Bucket comes from its speedy action. Multiplied digging leverage of the WILLIAMS closing arm gives *a big fast bite into tough materials.*

"With one 5-yard WILLIAMS Special Dredging Bucket, we have excavated as high as 174,000 cubic yards per month," *writes F. P. Gillen, Pres. and Gen. Mgr., Edw. Gillen Dock, Dredge & Construction Company, Beardstown, Illinois.*

You are sure of dependable service: "*All parts guaranteed against breakage as long as the bucket is used on the classes of work we recommend it for.*"

Write for photos of WILLIAMS Buckets doing the special kind of digging and handling work you have to do.

WILLIAMS "Special Dredging" Bucket. Built with the strength and power to stand up in the most difficult excavation and dredging.

G. H. WILLIAMS COMPANY, 603 Hayberger Lane, Erie, Pa.

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QUICK-ACTING CLAMSHELLS
All Parts Guaranteed Against Breakage

"CARROLL QUALITY" PRODUCTS
The Best in Welded Chain

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Missing Links Cold Shuts
"DC" Dredge Quality Crane Chain
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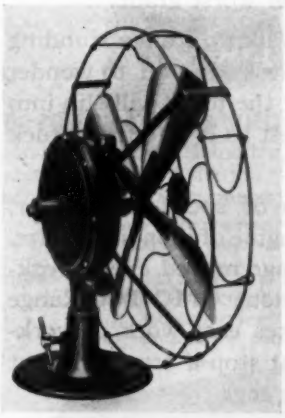

Mount This on Your Shovel or Dragline

Keep your runner cool through the hot months. A steam-driven fan mounted on your shovel or dragline excavator will make hot days cooler for your operator. Will drive away flies, mosquitoes, etc. This will mean greater comfort, greater yardage, and in the end—GREATER PROFITS.

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Give a GMC a capacity load, then point its radiator at your worst grade.

That GMC will walk up from a standing start in the time it takes you to wonder if it will do it. At the top it will slip into a road speed as fast as is safe for a truck of its size.

This combination of speed and power, delivered by an engine of economical size, means more yardage moved every working day. The famous GMC Two-Range Transmission makes easy work of working conditions that stop a truck without that extra power range.

A few minutes spent going into the mechanical superiority and profit-saving possibilities of GMC will save you some real money. Ask for a catalog.

GENERAL MOTORS TRUCK COMPANY
Division of General Motors Corporation
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General Motors Trucks

GMC

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Please send me the GMC catalog.

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The Excavating Engineer

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Vol. 18 | MILWAUKEE, SEPTEMBER 1924 | No. 9

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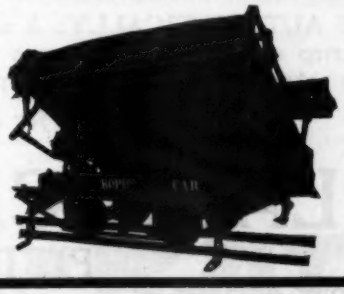

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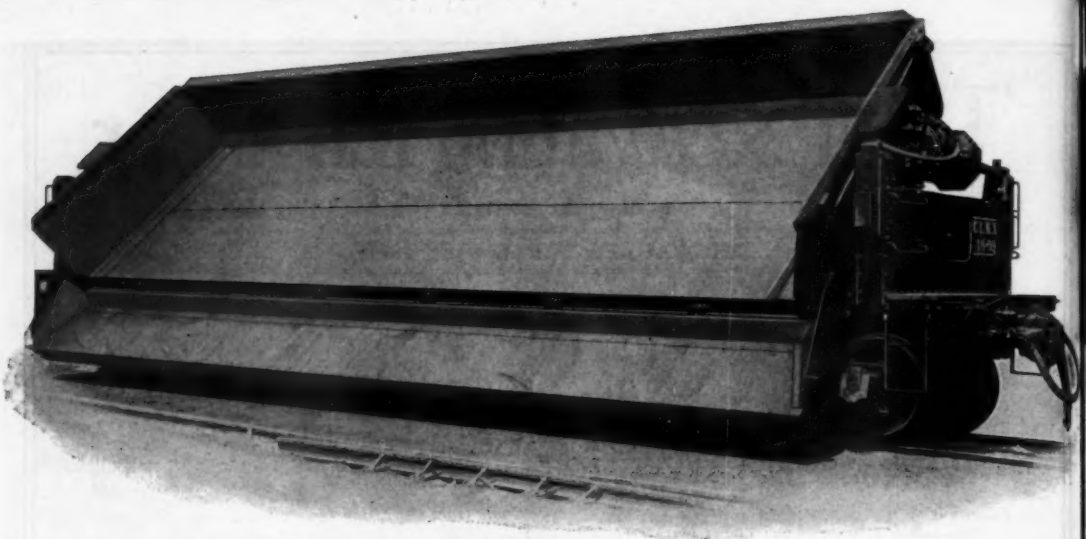

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Principal Features

DOWN TURNING DOOR: The side of the car, or door, opens outwardly and downwardly as the body moves to full-dumped position. This permits free and unobstructed discharge of the load.

EXTENDED FLOOR: The door, in full-dumped position, serves as an extension to the car floor, delivering the load clear of trucks and track.

WING PLATES: When dumping under conditions where the load back fills, wing plates on the doors plow the material away from the track as the car, or train of cars, is pulled out. Hand shoveling, with consequent loss of time, is, therefore, unnecessary to maintain roadway clearance.

DUMPS WITH ROLLING MOTION: The body rests on castings over the bolsters, being so designed that the movement of the body to full-dumped position is a rolling motion. The car, therefore, dumps without excessive shock to car structure and track, an important feature with cars of large capacity, owing to the mass involved and the frequency of dumping on temporary tracks.

CARRIES THE LOAD OVER THE BOLSTERS: The car body, or cargo box, is a self-supporting structure, resting on the underframe only at two points immediately over the bolsters. The underframe, therefore, is not subject to distortion from vertical load.

LOCKS AUTOMATICALLY: A small air cylinder operates in conjunction with the dump cylinders and serves to unlock the car when dumping. When the body is returned to the upright position it is locked automatically.

Write for Descriptive Leaflet No. 10

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UMI

Use I-R Portable Air Compressors

Roadway Excavation Using I-R Portable Compressor, "Jackhamer" and Leyner Sharpener

No. 33 Leyner Drill Steel Sharpener

One man with no helper sharpens 60 to 80 bits per hour on this machine. In less than two hours' time he redresses all the steels needed on the job, leaving him free for other work. Other advantages are perfect bits, exact gauge variation, faster drilling and less steel breakage.

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"We have one of your Portable Gasoline-Engine Driven Compressors, two 'Jackhamer' Drills, and a No. 33 Sharpener. The equipment and your service are giving the very highest degree of satisfaction. Operating with two drill runners, a blacksmith and one part time compressor attendant, we are drilling a footage that would by hand require 90 men, operating as 30 three-man hand drill gangs.

"These Compressor outfits will reduce costs on rock work all over. Were I again to start in the contracting business knowing what I now do, the first equipment I would buy would be an Ingersoll-Rand Portable Gasoline-Engine Driven Compressor outfit with drills, and certainly a sharpener."

An unsolicited letter from a contractor who took this means to express his satisfaction with I-R equipment and service.

Hundreds of other contractors are also reducing costs with Ingersoll-Rand Portable Compressor Outfits.

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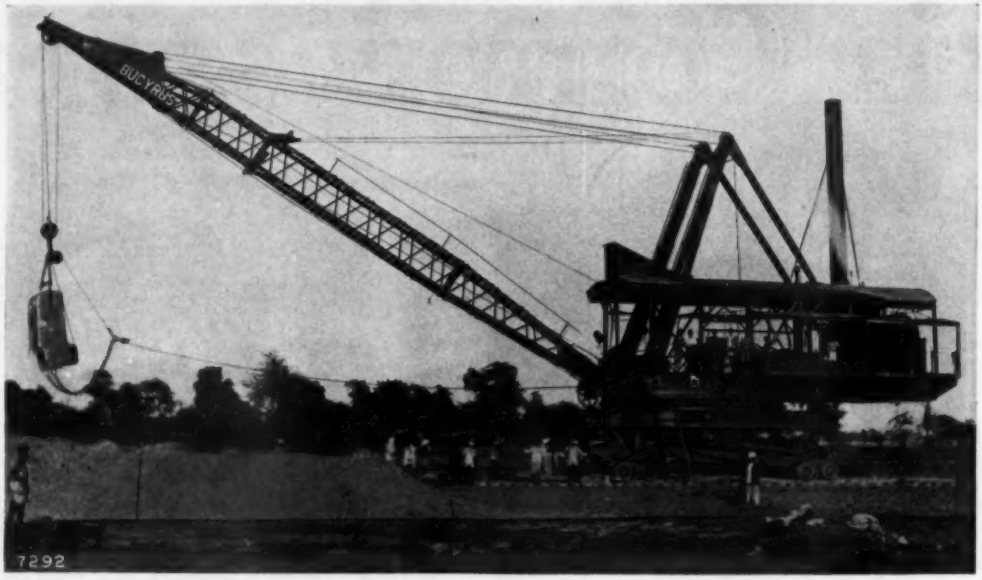
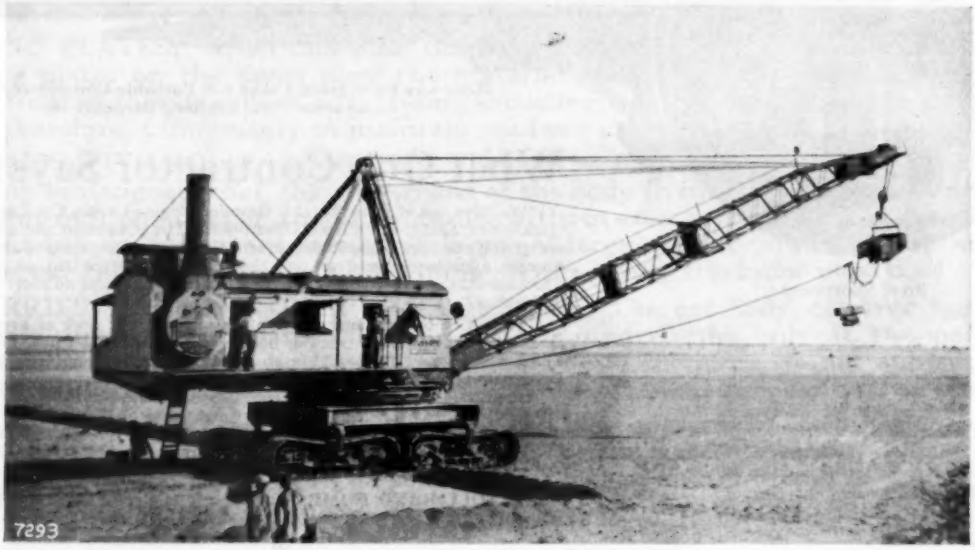


Bucyrus Class-24 Dragline, Equipped with an 85-foot Boom and a 4½-cubic-yard Bucket



View of Bucyrus Class-14 Dragline en route to the work after erection. There are two of this type in operation on the project.

Views of the Dragline Operations on Sutlej River Valley Irrigation Project, Punjab, India